

Research on the Impact of Employee Stock Ownership Plan on Enterprise Innovation

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Abstract

This paper selects the 2014-2018 Shanghai and Shenzhen A-share listed companies as a sample to study the impact of employee stock ownership plans on corporate innovation and finds that compared with companies that have not implemented employee stock ownership plans, the implementation of employee stock ownership plans can promote corporate innovation. The mechanism inspection found that employees mainly play the role of “executors” in enterprise innovation, and they have not promoted enterprise innovation investment. In addition, based on the characteristics of employees, this article finds that when the growth rate of employees is low and the composition of highly educated employees is relatively high, the implementation of employee stock ownership plans will have a greater impact on corporate innovation. This article enriches the research on the influencing factors of enterprise innovation with employees as the main body, and has certain guiding significance for improving the design of employee stock ownership system and promoting enterprise innovation and development.

Keywords

Employee Stock Ownership Plan, Corporate Innovation, Employee Characteristics

1. Introduction

The report of the 19th National Congress of the Communist Party of China pointed out that “China’s economy is in a critical period of transformation of growth mode and optimization of economic structure.” At this stage, enhancing the independent innovation capability of enterprises and promoting enterprise upgrading is the only way for China’s economy to achieve high-quality and sustainable development. Among the factors that affect the innovation of enterpris-

es, employees are the source of many innovative ideas. When active and creative people update their ideas and transform the ideas into new products, new services or new business models, innovation is realized (Bradley et al., 2016). At the same time, the degree of employee participation and labor enthusiasm have a non-negligible impact on improving the level of corporate governance and improving the governance structure, and ultimately achieving the maximization of corporate operating performance. Therefore, how to stimulate the enthusiasm and creativity of different individuals (employees) in the organization, tap the potential of employees, and promote enterprise innovation has strong theoretical value and practical significance.

Employee Stock Ownership Plan is a kind of employees other than management holding company stock or options of ways to share business ownership, participatory mechanisms for the distribution of profits, and in this way to achieve employee “The purpose of interest binding” (Li & Wang, 2017). ESOP from 20 Century 60 America’s, its incentive objects from the original managers, the core technology officer to expand to all employees, innovation and the development of equity system also contributed to the rapid development of the US economy and escalating industry. In the mid-1970s, the implementation of the employee stock ownership plan effectively alleviated the social conflicts in the United States caused by uneven income distribution and excessive income disparity at that time. In view of the above benefits, in the early stage of reform and opening up, China also officially introduced employee stock ownership and achieved certain results.¹ Such as injecting impetus into the reform of state-owned enterprises to promote independent innovation and profitability of enterprises, but at the same time a series of problems have also appeared, such as the suspension of employee shareholding plans such as the loss of state-owned assets due to acquisitions.² In June 2014, the China Securities Regulatory Commission issued the “Guiding Opinions on the Pilot Implementation of Employee Stock Ownership Plans by Listed Companies”, and reviewed the source of stocks, funding sources, and shareholding ratios of employee stock ownership plans. The contract elements are clearly stipulated. The purpose of this policy is to give employees more sense of responsibility, increase their enthusiasm for participating in company matters, and on this basis, improve the company’s independent innovation capabilities and enhance the value of the company. Since the release of the pilot opinions in 2014, the number of listed companies implementing employee stock ownership plans has increased. As of December 31, 2018, there were 721 Shanghai and Shenzhen A-share listed companies that have issued and successfully implemented employee stock ownership plans, with a total capital scale. The total capital scale reached 143.439 billion yuan. It can be

¹On May 15, 1992, the State System Reform Commission’s “Regulations on Joint Stock Company Limited” formally stipulated the internal employee shareholding plans of private placement companies and social placement companies.

²On December 25, 1998, the China Securities Regulatory Commission terminated the implementation of internal employee shareholding in listed companies.

seen that the implementation of employee stock ownership plans is more and more favored by listed companies.³

The input and use of human resources is a key part of the independent innovation of enterprises (Chen et al., 2016). The company implements an employee stock ownership plan so that employees can share the remaining returns of the company in addition to receiving a fixed salary, which not only enhances employees' sense of belonging to the company, but also enhances employees' efforts, loyalty to the company, strengthening of teamwork, and long-term attention to the company Value and even the willingness and ability to play a supervisory role (Meng et al., 2019). In theory, employee stock ownership plans can effectively elicit a positive market response (Li & Wang, 2017), improve corporate governance structures, and increase corporate innovation output.

However, some companies have suspended or stopped implementing employee stock ownership plans. According to statistics, since the end of 2017, more than 20 companies in the A-share market have terminated their employee stock ownership plans. Therefore, it is the focus of this article to explore whether the employee stock ownership plan can help to stimulate corporate innovation, and whether there are differences in the role of employee characteristics and ESOP system design elements in promoting corporate innovation. This paper uses China's Shanghai and Shenzhen A-share listed companies as a research sample to explore the impact of employee stock ownership plans on corporate innovation, and explore the differences in employee characteristics on the results of the implementation of employee stock ownership plans, and enrich the research perspectives on factors affecting corporate innovation.

2. Theoretical Analysis and Research Hypothesis

Innovation is a high-risk behavior with high investment, multiple stages, time-consuming, high difficulty, and strong uncertainty. It requires the joint participation of all employees. As the executive subject of innovation decision-making, employees' efforts, and collaboration level play an important role in whether an enterprise can effectively transform innovation input into innovation output. However, the upgrading of corporate innovation capabilities also faces the problem of insufficient employee motivation (Manso, 2011). Therefore, this article believes that the employee stock ownership plan can mainly improve the innovation ability of the enterprise through the following methods.

First, it can tie the interests of shareholders and employees together, strengthen cooperation between employees, and increase the enthusiasm of employees for innovative behavior. The employee stock ownership plan transforms employees from working for others (shareholders) to working for themselves. It binds the interests of employees and the company for a long time, encourages employees to participate more actively in daily management activities of the company, and inspires employees to take the initiative Sex and creativity (Yang

³The data comes from Wind Financial Terminal.

& Song, 2016). Zhang Xuan et al. (2017) pointed out that innovation is the key to enterprises gaining long-term competitive advantages and building competitive barriers. If employees respond negatively to innovative work, the possibility of innovation failure will increase, thereby damaging the long-term value of the company and the personal wealth of employees. On the contrary, if employees actively implement innovative decisions and give play to innovative ideas, it will not only facilitate the transformation or completion of innovative activities as soon as possible, but also increase the long-term value of the company and personal benefits.

The second is to attract and retain core employees through the benefit-binding mechanism, and avoid unnecessary brain drain (Oyer & Schaefer, 2005). As mentioned above, companies implement employee stock ownership plans. In addition to earning labor income and capital gains, employees also transform from employees to the status of company owners. This dual increase in benefits and status makes employees more willing to stay for a long time enterprise. Research has found that employee stock ownership can attract and retain employees and motivate them to work hard (Ittner & Larcker, 2003). For enterprises in the increasingly fierce market competition environment, sustained and effective inhaled expertise in high-tech talent is the enterprise to gain competitive advantage, the key to the realization of innovation output. Conversely, the loss of employees, especially the loss of core talents, may lead to a further decline in future production efficiency (Kong et al., 2015). The implementation of the employee stock ownership plan can reduce the risk of delay or interruption of innovation activities and promote the full implementation of innovation activities.

The third is to establish a risk-sharing and benefit-sharing mechanism between the enterprise and its employees, which will help reduce the degree of risk aversion of management and increase the level of enterprise innovation risk-taking. Compared with external investors, employees have more information advantages because they are in the enterprise, such as the dynamics of enterprise management, the quality and ability of managers, and so on. These information advantages can help them accurately judge the future development of the enterprise. According to the "Guiding Opinions", China's employee stock ownership plan follows the principles of compliance with laws and regulations, voluntary participation, and risk-sharing. Employees' willingness to take the risk of holding company stocks not only sends positive signals to the outside world, but also shows that employees have certain risk-bearing capabilities. Disperse corporate risks and make companies more willing to invest in research and development to achieve technological innovation and breakthroughs. In summary, this article proposes the following hypotheses.

H1: Given other conditions unchanged, compared with companies that have not implemented an employee stock ownership plan, the implementation of an employee stock ownership plan can promote the upgrading of corporate innova-

tion capabilities.

3. Research and Design

3.1. Data Source and Processing

3.1.1. Data Source

This article selects Shanghai and Shenzhen A-share listed companies from 2014 to 2018 as the research sample. Among them, the employee stock ownership plan data comes from the Wind database, and the patent data and other control variable data come from the CSMAR database. According to the research practice, this paper implements the following screening process: 1) Eliminate the sample companies with ST, financial, asset-liability ratio greater than 1, and missing or abnormal data; 2) To avoid the impact of endogeneity and extreme values on the regression results, continuous variables were taken mainly lagged one and one percent of Winsorize process; 3) Delete the sample companies that have not passed or stopped the implementation of the ESOP shareholders meeting. For sample companies with multiple ESOPs, only the first phase of the ESOP will be retained (Zhou et al., 2019). After the above processing, this article initially obtained 12,597 “company-annual” samples.

3.1.2. Propensity Score Matching

1) Matching method. In order to alleviate sample self-selection bias and improve the robustness of regression results, this paper selects a series of characteristic variables including industry, year, etc. as covariates. The sample adopts the nearest neighbor matching method of “one-to-two, no replacement” for the implemented employees. The sample companies (experimental group) of the shareholding plan match the control group (Tian & Meng, 2018). Specifically made using the annual number of characteristic variables of the model consisting of covariates (1) of Logit regression to calculate the year tends experimental and control group score $p(X_i)$, the experimental group and for each sample Company Match the only control group company so that the two $p(X_i)$ are the closest.

$$p(X_i) = P(ESOP_i = 1 | X = X_i) \quad (1)$$

Among them, $ESOP_i$ is a dummy variable. When enterprise i implements the employee stock ownership plan, $ESOP_i$ takes 1; otherwise, it takes 0. P is the probability density function, $p(X_i)$ is the propensity score value, and it is between 0 and 1. The number of samples regressed after PSM matching is 2567 “company-annual” sample values.

2) Matching results. Refer to the “Guiding Opinions” and other policy documents as well as the research of Chang et al. (2015) from the level of corporate assets and liabilities, growth, governance structure, growth, and industry. Select the following characteristic variables to form covariates. Including company size (*Size*), asset-liability ratio (*Leverage*), cash level (*Cash*), per capita fixed assets

(*Fixedpp*), per capita income (*Salespp*), listing age (*Age*), board size (*Board*), management shareholding ratio (*Share*), the proportion of the top ten shareholders (*Top 10*), government subsidies (*Subsidy*), the proportion of intangible assets (*Intangible*) and the industry (*Industry*). See **Table 2** for specific definitions.

In this paper, the experimental group and the control group before and after the matching were tested for characteristic differences, as shown in **Table 1**. Before matching, the mean value of the characteristic variables is significantly different between the experimental group and the control group. After matching, the mean difference test of all the characteristic variables is not significant, and

Table 1. Propensity score matching results.

Variable name	Matching process	Variable mean		Standard deviation (%)	Deviation reduction (%)	<i>t</i> statistic	<i>p</i> value
		test group	Control group				
<i>Size</i>	Before matching	22.3590	22.2610	7.90		1.8700	0.0610
	After matching	22.3590	22.3010	4.60	40.90	0.8700	0.3850
<i>Leverge</i>	Before matching	0.4227	0.4363	-6.80		-1.6800	0.0920
	After matching	0.4227	0.4072	7.70	-13.70	1.4700	0.1430
<i>Cash</i>	Before matching	0.1624	0.1630	-0.60		-0.1300	0.8940
	After matching	0.1624	0.1633	-0.90	-57.60	-0.1700	0.8680
<i>Fixedpp</i>	Before matching	12.5100	12.6670	-14.90		-3.5800	0.0000
	After matching	12.5100	12.5370	-2.50	83.10	-0.4900	0.6260
<i>Salespp</i>	Before matching	13.8250	13.8290	-0.50		-0.1200	0.9010
	After matching	13.8250	13.8300	-0.60	-16.70	-0.1100	0.9130
<i>Age</i>	Before matching	9.1879	12.0680	-43.40		-10.2700	0.0000
	After matching	9.1879	8.8752	4.70	89.10	0.9600	0.3380
<i>Board</i>	Before matching	8.2855	8.5855	-19.30		-4.5700	0.0000
	After matching	8.2855	8.2645	1.40	93.00	0.2700	0.7890
<i>Indep</i>	Before matching	0.3806	0.3757	8.60		2.2500	0.0250
	After matching	0.3806	0.3799	1.20	85.70	0.2300	0.8210
<i>Share</i>	Before matching	0.1945	0.1201	37.50		10.0100	0.0000
	After matching	0.1945	0.1899	2.30	93.80	0.4000	0.6860
<i>Top 10</i>	Before matching	59.8520	57.8020	14.50		3.4900	0.0000
	After matching	59.8520	59.7920	0.40	97.10	0.0800	0.9370
<i>Subsidy</i>	Before matching	0.0051	0.0047	4.20		0.9000	0.3680
	After matching	0.0051	0.0050	1.40	66.80	0.3700	0.7080
<i>intangible</i>	Before matching	0.0469	0.5015	-5.30		-1.3000	0.1930
	After matching	0.0469	0.4712	-0.40	92.90	-0.0800	0.9390

the mean value is more evenly distributed between the experimental group and the control group. And the standard deviations of the characteristic variables in the observation interval are all less than 20% of the empirical standard (Rosenbaum & Rubin, 1985), which proves that the matching process in this paper is better, and effectively alleviates the difference in characteristic variables between the experimental group and the control group. The influence of variables, that is, sample self-selection bias. **Figure 1** is a graph of the kernel density function of the propensity score (Pscore) before and after matching.

3.2. Variable Selection and Definition

1) The explained variable. With reference to the research methods of Reeg (2013), Li Linmu and Wang Chong (2017), this article selects the total number of patent applications (*Apply*) and the number of invention patent applications (*Iapply*) in the current year to measure the innovation capabilities of enterprises.⁴

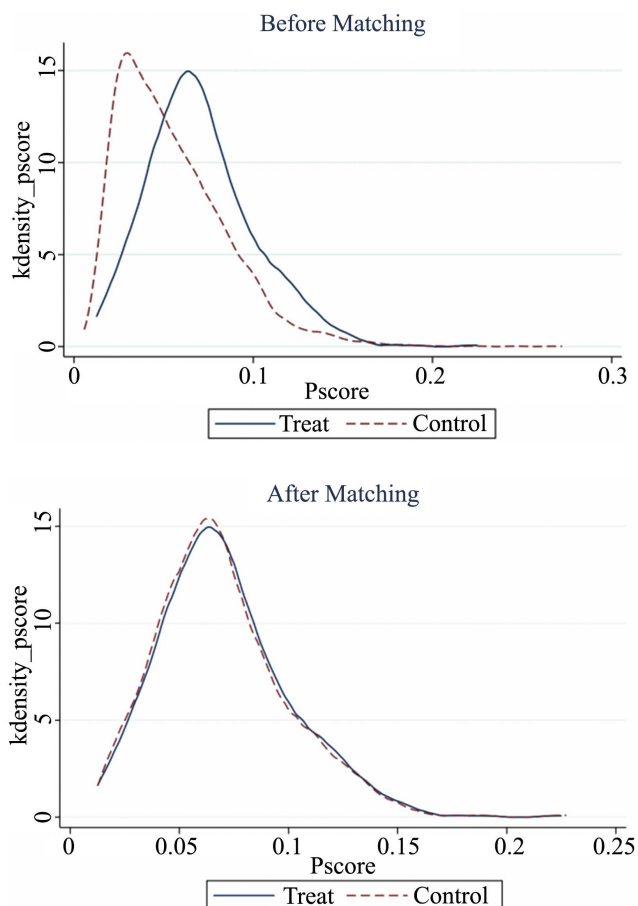


Figure 1. Propensity score matching kernel density function graph.

⁴The reason why the number of patent applications is selected to measure the innovation output of a company is that compared with the patent grant year, the patent application year can more accurately describe the time of the company's innovation output, and the patent grant usually has a certain lag (Meng et al., 2019).

2) Explain variables. As used herein, ESOP dummy variable ($Esop_{i,t}$), if the company i in the first t years of the implementation of the presence or ESOP, $Esop_{i,t}$ take 1, take otherwise 0.

3) Control variables. This article selects control from the level of corporate assets and liabilities, governance structure, and growth variables, and set the year ($Year$) and industry ($Industry$) dummy variables, the variable definitions are shown in **Table 2**.

3.3. Model Design

This paper uses the following model (2) to test the impact of employee stock

Table 2. Variable definition table.

type	variable name	variable	Variable definitions
Explained variable	Enterprise innovation	<i>Apply</i>	Ln (1 + total number of patent applications)
		<i>Iapply</i>	Ln (1 + number of invention patent applications)
Explanatory variables	Dummy variable of employee stock ownership plan	<i>Esop</i>	Enterprise implements employee stock ownership plan to take 1, otherwise take 0
Control variable	Enterprise size	<i>Size</i>	Ln (1 + total assets)
	Assets and liabilities	<i>Leverge</i>	Total liabilities/assets
	Cash level	<i>Cash</i>	Total monetary funds/assets
	Fixed assets per capita	<i>Fixedpp</i>	Fixed assets/total number of companies
	Per capita income	<i>Salespp</i>	Operating income/total number of company
	Listing age	<i>Age</i>	Ln (1 + years on the market)
	Board size	<i>Board</i>	Total number of board of directors
	Management shareholding ratio	<i>Share</i>	Number of shares held by management/total number of shares of the company
	Shareholding ratio of the top ten shareholders	<i>Top 10</i>	Number of shares held by the top ten shareholders/total number of shares of the company
	government subsidy	<i>Subsidy</i>	Total government grants/assets received in the current year
	Proportion of intangible assets	<i>Intangible</i>	Intangible assets/total assets
	Industry dummy variables	<i>Industry</i>	Refer to the 2012 industry classification standards of the China Securities Regulatory Commission
	Annual dummy variable	<i>Year</i>	Year dummy variables from 2014 to 2018

ownership plans on corporate innovation. Which left model $t + 1$ period Enterprise innovation indicators, including innovation output indicators, with the total amount of patent applications (*Apply*), the number of patent applications for invention (*Iapply*) measure.

$$\begin{aligned} \text{Innovation}_{i,t+1} = & \beta_0 + \beta_1 \text{Esop}_{i,t} + \beta_2 \text{Size}_{i,t} + \beta_3 \text{Leverge}_{i,t} + \beta_4 \text{Cash}_{i,t} \\ & + \beta_5 \text{Fixedpp}_{i,t} + \beta_6 \text{Salespp}_{i,t} + \beta_7 \text{Age}_{i,t} + \beta_8 \text{Board}_{i,t} \\ & + \beta_9 \text{Share}_{i,t} + \beta_{10} \text{Top}_{i,t} + \beta_{11} \text{Subsidy}_{i,t} + \lambda_i + \mu_t + \varepsilon_{i,t} \end{aligned}$$

Among them, λ_i is the control industry effect, μ_t is the control annual effect, and $\varepsilon_{i,t}$ is the residual term. This article mainly focuses on the regression coefficient β_1 . If β_1 is significantly greater than 0, it verifies the hypothesis of this article that employee stock ownership plans can promote enterprise innovation.

4. Empirical Results

4.1. Descriptive Statistical Analysis

Table 3 shows the descriptive statistical results of the variables. It can be seen from **Table 3** that the average and median of the total number of patent applications (*Apply*) are 3.22 and 3.18, respectively, and the minimum and maximum values are 0.69 and 7.2 in terms of enterprise innovation in the full sample. The standard deviation is 1.39, the minimum value of the total number of patent applications (*Apply*) of the paired sample companies (*Apply*) is 0 and the maximum value is 6.63, and the standard deviation is 1.37, indicating that the innovation output of listed companies in China is unbalanced and there are large differences. At the same time, comparing the sample standard deviations of 1.43 and 1.41 before and after the matching of the number of enterprise invention patent applications (*Iapply*) also reached a consistent conclusion.

Table 3. Descriptive statistics.

variable	Full sample ($N = 12,597$)					Paired samples ($N = 2567$)				
	Mean	median	Standard deviation	Min	Max	Mean	median	Standard deviation	Minimum	Max
<i>Apply</i>	3.220	3.180	1.390	0.690	7.200	3.330	3.300	1.370	0.690	7.370
<i>Iapply</i>	2.290	2.200	1.430	0	6.370	2.370	2.300	1.410	0	6.630
<i>Size</i>	22.26	22.11	1.300	19.65	26.15	22.31	22.13	1.260	20.09	26.11
<i>Leverge</i>	0.440	0.430	0.210	0.0600	0.910	0.410	0.410	0.200	0.0600	0.850
<i>Cash</i>	0.160	0.130	0.110	0.0100	0.560	0.160	0.140	0.110	0.0200	0.550
<i>Fixedpp</i>	12.65	12.63	1.080	9.490	15.59	12.54	12.54	1.010	9.620	15.24
<i>Salespp</i>	13.83	13.72	0.860	11.99	16.48	13.83	13.70	0.820	12.17	16.48
<i>Age</i>	8.560	9	1.670	5	15	8.260	9	1.430	5	12
<i>Board</i>	0.380	0.360	0.0500	0.330	0.570	0.380	0.360	0.0600	0.330	0.570
<i>Share</i>	0.120	0	0.190	0	0.680	0.190	0.080	0.210	0	0.700
<i>Top 10</i>	57.89	58.62	14.94	23.34	90.26	59.65	60.88	14.45	24.69	90.86
<i>Subsidy</i>	0	0	0.0100	0	0.0300	0	0	0.0100	0	0.0300
<i>Intangible</i>	0.0500	0.0400	0.0500	0	0.330	0.0500	0.0400	0.0400	0	0.270

4.2. Analysis of Regression Results

In this paper, the model (2), respectively, to assume a regression analysis, **Table 4** shows that employee stock ownership plan (*Esop*) and Enterprise innovation variable (*Apply*, *Iapply*) regression coefficients were 0.132 and 0.147, and in 1% of Significantly on the level. It shows that the implementation of the employee

Table 4. Employee stock ownership plan and enterprise innovation.

variable	Innovation		Innovation: based on patent grant	
	(1)	(2)	(3)	(4)
	<i>Apply</i>	<i>Iapply</i>	<i>Applygrant</i>	<i>Iapplygrant</i>
<i>Esop</i>	0.132** (2.33)	0.174*** (2.73)	0.113* (1.84)	0.067 (1.27)
<i>Size</i>	0.721*** (24.29)	0.638*** (19.15)	0.709*** (21.92)	0.403*** (14.60)
<i>Leverge</i>	0.337** (1.99)	-0.051 (-0.27)	0.509*** (2.75)	0.120 (0.77)
<i>Cash</i>	0.404 (1.57)	0.438 (1.51)	0.379 (1.36)	0.253 (1.05)
<i>Fixedpp</i>	-0.221*** (-7.05)	-0.044 (-1.38)	-0.247*** (-7.26)	-0.011 (-0.42)
<i>Salespp</i>	-0.153*** (-3.82)	-0.240*** (-5.65)	-0.184*** (-4.21)	-0.135*** (-3.83)
<i>Age</i>	-0.017*** (-2.97)	-0.024*** (-3.74)	-0.023*** (-3.65)	-0.017*** (-3.24)
<i>Board</i>	0.001 (0.06)	-0.010 (-0.50)	0.001 (0.04)	-0.009 (-0.53)
<i>Share</i>	0.348** (2.54)	0.390** (2.51)	0.208 (1.39)	0.098 (0.76)
<i>Top 10</i>	-0.007*** (-3.80)	-0.013*** (-6.28)	-0.006*** (-2.79)	-0.005*** (-2.96)
<i>Subsidy</i>	23.841*** (5.01)	43.475*** (8.16)	16.552*** (3.19)	28.020*** (6.35)
<i>Intangible</i>	-1.560** (-2.49)	-1.270* (-1.84)	-1.651** (-2.42)	-0.709 (-1.24)
<i>Year & Industry</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>_cons</i>	-8.674*** (-11.72)	-7.369*** (-9.34)	-7.833*** (-9.72)	-4.846*** (-7.41)
<i>N</i>	2095	2095	2095	2095
<i>adj. R²</i>	0.365	0.218	0.326	0.357

stock ownership plan can promote the innovation of enterprises, which is manifested by a significant increase in the number of patent applications, which supports the inference of hypothesis 1 in this article.

From the perspective of the effect of the control variables, the size of the company (*Size*) is significantly positively correlated with the innovation output of the company. It shows that the larger the scale of the enterprise, the more conducive to the company's technological development and innovation, increase market share, and obtain greater economic benefits. Per capita income (*Salespp*), government grants (*Subsidy*) and business-related innovation system are significantly positive, indicating that the higher per capita income, the stronger the motivation of employee's innovation activities; the more government subsidies, the more money innovation activities, which is conducive to increasing innovation output. In addition, the regression coefficient of management shareholding ratio (*Share*) is significantly positive, indicating that executive equity incentives also promote corporate innovation. From this, it can be judged that employee shareholding plans and executive equity incentives can enhance corporate shareholders and labor. The institutional arrangements for the consistency of the interests of the two parties do not completely overlap with each other.

4.3. Robustness Test

Compared with patent applications, the number of patents granted is certified by the National Patent Office, and the number of patents granted can more accurately reflect the innovation capability of the enterprise (Meng et al., 2019). Therefore, this article uses the total number of granted patents (*Applygrant*) and the amount of invention patents granted (*Iapplygrant*) to redefine the innovation of enterprises. The regression results are shown in the columns (3) to (4) of **Table 4**. There is a significant positive correlation between grants, indicating that compared with listed companies that have not implemented ESOPs, companies that have implemented ESOPs have significantly increased their patent grants. However, the coefficient between ESOP and the number of patents granted by enterprises is not significant. The reason may be that some companies have not obtained granted patents.

4.4. Innovative Mechanism Inspection Based on "Executors"

Based on the results of the previous research, this article continues to examine the impact mechanism of employee stock ownership plans on corporate innovation. From the theoretical logic analysis, shareholders and management are mainly the main body of the innovation decision-making link, and their impact on innovation investment should be greater, and employees are at the end of the "shareholder-management-employee" agency chain and are mainly responsible for innovation decision-making. The role of "executor" mainly affects the transformation of enterprise innovation input to innovation output, rather than innovation input. In this regard, this paper conducts a test. The results are shown in the model (1) in **Table 5**. The regression coefficient of *Esop* is not significant,

Table 5. Tests of innovation mechanism based on “executors”.

	(1)	(2)	(3)	(4)	(5)
	<i>RDInv</i>	<i>Apply</i>	<i>Iapply</i>	<i>Apply</i>	<i>Iapply</i>
<i>Esop</i>	-0.088 (-0.49)	0.122** (2.17)	0.123** (2.03)	-0.148 (-1.55)	-0.048 (-0.54)
<i>RDInv</i>		0.051*** (7.50)	0.092*** (8.37)	0.042*** (5.75)	0.075*** (9.75)
<i>Esop × RDInv</i>				0.065*** (3.52)	0.032** (2.07)
<i>Controls</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>Year & Industry</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>_cons</i>	14.927*** (6.20)	-9.375*** (-12.20)	-10.384*** (-11.78)	-9.278*** (-12.11)	-12.477*** (-15.70)
<i>N</i>	2226	1979	1979	1979	1979
<i>Adj_R²</i>	0.191	0.372	0.313	0.376	0.362

indicating that the employee stock ownership plan does not affect the enterprise's innovation investment. After controlling R&D investment (*RDInv*), the regression coefficient of *Esop* is still significantly positive, which further supports the above conclusion. Secondly, the interaction term of R & D investment and employee stock ownership plan (*Esop × RDInv*) is introduced into the regression model. The results are shown in columns (4)-(5) of **Table 5**. The regression coefficient of *Esop × RDInv* is significantly positive, indicating that employee stock ownership The implementation of the plan can effectively promote the transformation of enterprise innovation input to innovation output, instead of directly affecting innovation input, and supports the inference that employees play “executives” in innovation upgrades.

4.5. Expansion Research Based on Employee Characteristics

Combined with the previous analysis, the employee stock ownership plan can significantly improve the innovation output and profitability of the enterprise, thereby promoting the upgrading of the enterprise. To this end, this article further investigates the deep-level relationship of the employee stock ownership plan to the company's innovation, and separately conducts research on the characteristics of the employee.

It can be seen from theoretical logic analysis that employees are at the end of the “shareholder-manager-employee” entrusted-agent chain. They mainly play the role of “executor” of enterprise innovation activities. The Employee Stock Ownership Plan realizes the “bundling of interests” between employees and shareholders and employees, enhances employees' personal efforts and professional knowledge and skills, and promotes enterprise innovation. In this regard, combined with the characteristics of enterprise upgrading, this article examines

the impact of employee stock ownership plans on enterprise upgrading from two aspects of unit employee growth and employee educational background.

Unit employee growth is the difference between the market value of shareholders' equity and the book value divided by the total number of people in the company. When an enterprise has a large number of employees, there may be egalitarian abuses, causing employees to "free ride" behavior, thereby reducing the value of the enterprise (Hochberg & Lindsey, 2010; Kim & Ouimet, 2014). To this end, this paper conducts a group regression analysis based on the "annual-industry" median of employee growth. It can be seen from the regression results in **Table 6** that in the samples with low unit growth, the regression coefficient of ESOP is significantly positive, while in the samples with high unit growth, it is not completely significant, indicating that there are too many employee holders, and the more there may be employees "free-riding" and "eating a big pot of rice" behavior. Currently, the implementation of the employee stock ownership plan has a more significant incentive effect on the company's innovation. It supports the hypothesis of this article..

Secondly, this article examines the influence of the staff's academic qualifications. Enterprise employees may come from different departments and have different professional knowledge and skills. For employees with a higher degree of education, the greater the role it may play in corporate innovation, the implementation of ESOP for such employees will have a more incentive effect. To this end, this paper conducts a group regression analysis based on the "annual-industry" median of the proportion of graduate students and above. **Table 7** shows the regression results, employee stock ownership plan in a postgraduate degree and above the regression line in the sample number is significantly positive, in line with inferred herein. It shows that the incentive effect of ESOP on enterprise innovation will increase with the increase of employees' role in the enterprise.

Table 6. Employee growth effect test.

	(1)	(2)	(5)	(6)
	Unit employees have high growth		Unit staff into long of low	
variable	<i>Apply</i>	<i>Iapply</i>	<i>Apply</i>	<i>Iapply</i>
<i>Esop</i>	0.127 (1.57)	0.038 (0.46)	0.138* (1.69)	0.173** (1.98)
<i>Controls</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>Year & Industry</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>_cons</i>	-12.698*** (-10.19)	-14.762*** (-11.40)	-5.086*** (-4.60)	-6.054*** (-5.13)
<i>N</i>	1046	1046	1049	1049
<i>adj. R²</i>	0.362	0.345	0.221	0.185

Table 7. Test of the role of employees' academic qualifications.

variable	(1)	(2)	(5)	(6)
	High proportion of graduate students and above	High proportion of graduate students and above	Low proportion of graduate students and above	Low proportion of graduate students and above
<i>Esop</i>	<i>Apply</i> 0.153** (2.09)	<i>Iapply</i> 0.170** (1.97)	<i>Apply</i> 0.131 (1.59)	<i>Iapply</i> 0.105 (1.25)
<i>Controls</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>Year & Industry</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>_cons</i>	-8.557*** (-8.33)	-4.576*** (-4.11)	-6.212*** (-5.48)	-8.399*** (-7.26)
<i>N</i>	1083	1083	1012	1012
<i>adj. R²</i>	0.469	0.258	0.257	0.232

5. Research Conclusions and Policy Recommendations

With the promulgation of the “Guiding Opinions”, the introduction of employee shareholding to improve the modern corporate incentive system has aroused widespread concern from all walks of life. The main purpose of the employee stock ownership plan is to bind the personal interests of employees to the long-term value of the company, improve the effort and creativity of employees, create greater value for the company, and promote the upgrade of the company. This article takes the country’s increasing emphasis on corporate innovation as a background and takes the Shanghai and Shenzhen A-share listed companies from 2014 to 2018 as a sample to examine the impact of employee stock ownership plans on corporate innovation. The study found that, compared with companies that have not implemented an employee stock ownership plan, the implementation of an employee stock ownership plan can promote the innovation of the enterprise, which is manifested in the improvement of innovation output and profitability. The mechanism inspection found that employees mainly play the role of “executors” in the innovation and upgrading of enterprises and have not promoted the investment in enterprise innovation. Furthermore, based on the characteristics of employees, this article finds that the lower the growth of employees and the higher the composition of highly educated employees, the more effective the implementation of the employee stock ownership plan will promote the innovation of the enterprise.

The research conclusions of this article have the following policy implications: 1) The implementation of employee stock ownership plans by listed companies has a significant impact on corporate innovation, but it is also necessary to pay attention to the impact of employees’ own characteristics on the implementation effects. For example, when employees have a higher degree of education, the greater the role that employees may play in the company, the greater the probability that these employees will acquire shares in the company, and the greater

the incentive effect of employee stock ownership. Therefore, when designing an employee stock ownership system, an enterprise should consider the contribution of employees in different departments and positions to the company to avoid “equalism”. 2) When implementing an employee stock ownership plan, an enterprise should fully consider its internal needs and external environment. For example, when an enterprise grants too many shares to its employees, employees may “free ride” and other behaviors, which will damage the value of the enterprise. Therefore, companies should make scientific and reasonable planning in terms of employee shareholding ratio, capital scale, funding sources, lock-in period, etc., in order to better motivate employees to engage in corporate production and operation, and maximize the positive effect of employee shareholding plans on corporate innovation. 3) The employee stock ownership system in China focuses on the binding of interests, and the employee stock ownership plan should be implemented mainly with an incentive-oriented orientation. Although the ESOP employees into a business owner, there is still a lack of comprehensive laws and regulations to implement the protection of employee rights, and therefore policy makers and regulatory authorities should further strengthen and improve the design and development of ESOP-related laws and regulations. Provide a strong system guarantee for the majority of workers, and promote the long-term development of enterprises.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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